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ABSTRACT

To verify the assumption that research activities do not interfere with the normal instruction given to students in the demonstration school of the Kamehameha Early Education Program (KEEP), each class's educational and intellectual achievement was assessed, and comparisons were made with other classes in Hawaii. This report compares the results of standardized IQ and achievement tests given to KEEP Classes I, II, and III with results from a school in a rural area of a neighbor island and a school in a middle-class suburb of Honolulu. The results are presented for administrations of the Wechsler Preschool and Primary Scale of Intelligence (WPPSI), the California Test of Mental Maturity (CTMM), the Metropolitan Readiness Test (MRT), and the Gates-MacGinitie Reading Test. The data indicate that KEEP is meeting its educational responsibilities for its three classes in terms of academic readiness and general intellectual achievement, both in comparison to national norms and to relatively comparable schools. (Author/JMB)

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Technical Report #36

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The Kamehameha Early Education Program

The Kamehameha Early Education Program (KEEP) is a research and development program of The Kamehameha Schools/Bernice P. Bishop Estate. The mission of KEEP is the development, demonstration, and dissemination of methods for improving the education of Hawaiian and Part-Hawaiian children. These activities are conducted at the Ka Na'i Pono Research and Demonstration School, and in public classrooms in cooperation with the State Department of Education. KEEP projects and activities involve many aspects of the educational process, including teacher training, curriculum development, and child motivation, language, and cognition. More detailed descriptions of KEEP's history and operations are presented in Technical Reports #1-4.

Abstract

To verify the assumption that research activities do not interfere with the normal instruction given to the students of the Kamehameha Early Education Program (KEEP), each class's educational and intellectual achievement is assessed, and comparisons made with other classes in Hawaii. This report discusses the results of standardized IQ and achievement tests given to KEEP's Class I, II, and III, and to two comparison schools in Kalihi, to a school in a rural area of a neighbor island, and to a school in a middle-class suburb of Honolulu. The results are presented for administrations of the Wechsler Preschool and Primary Scale of Intelligence (WPPSI), the California Test of Mental Maturity (CTMM), the Metropolitan Readiness Test (MRT), and the Gates-MacGinitie Reading Test. The data indicate that KEEP is meeting its educational responsibilities for its three classes in terms of academic readiness and general intellectual achievement, both in comparison to national norms and to the relatively comparable schools in Kalihi.

Technical Report #36

Standardized Test Results, 1972-75: KEEP and Selected Comparison Groups

Ellen Antill

The Kamehameha Early Education Program (KEEP) is a research and development center, established to find ways of improving the educational achievements of Hawaiian and part-Hawaiian children. While the research activities of KEEP are potentially important to children throughout the State, a primary concern is the education of the students of Ka Na'i Pono, the KEEP demonstration school.

Almost all research at KEEP takes place within the context of normal instruction, and thus research activities should not interfere with learning. To verify this assumption, however, careful assessment of each class's educational and intellectual achievement is maintained, and comparisons are made with other classrooms in Hawaii.

Since 1972, with the entry of the first kindergarten, each class has received various achievement and intellectual tests--the Wechsler Preschool and Primary Scale of Intelligence (WPPSI),[1] the California Test of Mental Maturity (CTMM), the Metropolitan Readiness Test (MRT), and the Gates-MacGinitie Reading Test--in the fall and spring of their school years. Beginning in 1973, through the cooperation of the DOE, various schools in the Kalihi area, one on a neighbor island, and another in a suburban area were chosen as comparison groups. With the exception of the WPPSI, these schools

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[1]The problems of measuring and interpreting IQ, particularly in a minority culture, are well known. We do not believe that these tests measure "basic intelligence," whatever that might be. However, the tests used do indeed predict well to eventual school success, and thus they can be examined as measures of "readiness for school achievement."

received the same tests at the same times as they were given at KEEP.

This report shows that KEEP Class I (entered 1972-73), Class II (entered 1973-74), and Class III (entered 1974-75) compare favorably in general intellectual achievement to national norms and to various comparison schools in Hawaii.

Table 1 summarizes the groups who received the tests to be discussed here and the times of administration for each group. The data in this report are presented for each group and each administration by test.

WPPSI 1972-75

The Wechsler Preschool and Primary Scale of Intelligence (WPPSI) is

> at once an extension of the WISC [Wechsler Intelligence Scale for Children] and a separate scale designed to cope more effectively with the psychometric problems presented in testing the 4-to-6½-year old child. It consists of eleven tests, six Verbal and five Performance...administered with Verbal and Performance intermixed.[2]

This test was given at the children's homes in an individual administration by research assistants from KEEP prior to the beginning of each class's kindergarten year (Class I: September, 1972; Class II: September, 1973; Class III: September, 1974). The test was readministered to each class at the end of their kindergarten year in May. Since the administration is so time consuming and the test materials so costly, this test was not given to any control groups. The mean Total IQ for Class I (N=27) was 90.19 in September and had increased an average of 11.12 points by May. The mean Total IQ for Class II (N=27) was 83.81 and increased to a mean of 97.15 in May. The mean Total IQ for Class III (N=28) in September was 91.32 and increased an average of 13.39 points by May. According to the Intelligence Classifications of the WPPSI Manual, Class I and III initially scored in the Average range of IQ and remained in

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[2]David Wechsler. Manual for the Wechsler Preschool and Primary Scale of Intelligence. The Psychological Corporation, New York: 1967.

Table 1

Schedule of Standardized Tests for KEEP & Comparisons

Group	Time of Administration					
	1972-73		1973-74		1974-75	
	Fall	Spring	Fall	Spring	Fall	Spring
KEEP Class I	MRT WPPSI	MRT WPPSI	CTMM	CTMM Gates	CTMM	CTMM Gates
KEEP Class II	-----	-----	MRT WPPSI	MRT WPPSI CTMM	CTMM	CTMM Gates
KEEP Class III	-----	-----	-----	----	MRT WPPSI CTMM	MRT WPPSI CTMM
Urban Schl 1	-----	-----	------	CTMM Gates	-----	Gates
Urban Schl 2	-----	-----	MRT	MRT	MRT CTMM	MRT CTMM Gates
Rural Schl	-----	-----	MRT CTMM	MRT CTMM Gates	MRT CTMM	MRT CTMM Gates
Suburb. Schl	-----	----	-----	Gates	MRT	MRT CTMM Gates

this range, while Class II initially scored in the Dull Normal Range and, by the end of their first year, scored in the Average range. All three classes show highly significant increases (Class I: t=4.52; df=26; $p < .002$; Class II: t=8.83; df=26; $p < .002$; Class III: t=10.18; df=27; $p < .002$).

A closer examination of the test results, which are fully presented in

Table 2, reveals that all three classes, particularly Class I, are composed of two distinct groups of students. If one divides each class by classifying IQs of 90 or above as average (c.f. WPPSI Manual), it is apparent that those children initially scoring 89 or below change more in IQ in all three classes.

The High Change Group (IQs=89 or below) in Class I (N=13) increased 18.54 points from May to September in contrast to the Low Change Group (IQs 90 or above) who increased a mere 3.71 (N=14). In other words, the Low Change Group entered Average and remained so, while the High Change Group began kindergarten in the Borderline range and ended it in the Average range of IQ.

Class II and III follow this trend to a lesser degree. The High Change Group in Class II had a mean IQ in the Borderline range on the pretest and a mean IQ in the Dull Normal range on the posttest. The Low Change Group of Class II entered in the Average range and increased in May to a Bright Normal range. Both High and Low Change Groups of Class III are identical to Class II in the direction of their change (as measured by Intelligence Classifications, High: Borderline to Dull Normal, Low: Average to Bright Normal).

The High Change Group of Class I increases significantly more than the Low Change Group in all three IQs (Total: $t=3.67$; $df=25$, $p<.002$; Verbal: $t=2.21$, $df=25$, $p<.02$; Performance: $t=3.66$; $df=25$, $p<.002$). In Class II, however, the High Change Group increases more than the Low Change Group only in Total IQ ($t=1.90$, $df=25$, $p<.05$) and in Performance IQ ($t=2.62$, $df=25$, $p<.002$). In Class III, the High Change Group does not change significantly more than the Low Change Group, in Verbal or Total IQ, but does in Performance ($t=2.06$, $df=27$, $p<.05$).

Although the increase in IQ in children with initially low ones is significant to some extent in all three, it is difficult to determine whether this change can be attributed to KEEP in particular or to school in

Table 2

Mean WPPSI IQs & Change Scores, Class I, II, III*

Group	Total IQ			Verbal IQ			Performance IQ		
	Fall	Spring	Change	Fall	Spring	Change	Fall	Spring	Change
	Class I: 1972-73 (N=27)								
Total	90.19	101.31	11.12	86.22	92.70	6.48	97.12	110.93	13.81
Lo Change	105.29	109.0	3.71	98.71	100.50	1.79	110.57	116.29	5.72
Hi Change	75.08	93.62	18.54	72.38	84.31	11.93	82.69	105.15	22.46
	Class II: 1973-74 (N=27)								
Total	83.81	97.15	13.34	80.63	90.30	9.67	89.70	104.93	15.23
Lo Change	99.54	109.91	10.37	98.09	107.36	9.27	101.18	110.45	9.27
Hi Change	73.0	88.37	15.37	68.63	78.56	9.93	81.81	101.13	19.32
	Class III: 1974-75 (N=28)								
Total	91.32	105.21	13.89	87.0	100.32	13.32	97.79	109.46	11.67
Lo Change	101.56	113.83	12.27	97.0	108.83	11.83	106.28	116.15	9.87
Hi Change	72.90	89.70	16.80	69.0	85.0	16.0	82.50	96.80	14.30

*All data are based on kindergarten administrations

general, or possibly, to statistical regression effects (see Technical Report #5). In any case, the rise is promising, and KEEP students do seem to be doing well in the abilities measured by the WPPSI.

The national norms for WPPSI Full Scale IQ for children of this age confirm this success. Class I's Spring Total IQ of 101.31, Class II's Spring Total IQ of 97.15, and Class III's Spring Total IQ of 105.21 compare favorably with the national average of 100. After one year of school, the children at KEEP score well in the average range of intelligence. One might note that Class III entered the highest of all KEEP classes and, yet, had the highest mean change score.

CTMM

The California Test of Mental Maturity (CTMM) is a standardized test which measures functional capacities basic to learning. Hand scoring derives an IQ and a Mental Age for Language, Nonlanguage, and Total IQ, as well as percentile rank, standard scores, and stanines for five factors: logical reasoning, spatial relationships, numerical reasoning, verbal concepts, and memory.

KEEP's Class I was administered Level 0 of the CTMM in October, 1973 at the beginning of first grade, and Level 1 in May, 1974 (end of first grade) and May, 1975 (end of second grade). KEEP's Class II was administered Level 0 in May, 1974 (end of kindergarten year) and May, 1975 (end of first grade). Class III was given Level 0 at the beginning and end of their kindergarten year, September, 1974 and May, 1975.

The CTMM Level 0 and 1 were given to a kindergarten and first grade in a Kalihi school (Urban School 1) with a smaller percentage of part-Hawaiian children and children from families receiving state financial assistance (see Technical Report #13 for a full description of the KEEP class's population)

Table 3

Mean CTMM IQs & Change Scores: KEEP & Comparisons

Group	Fall			Spring			Change		
	Lang.	Nonlang.	Total	Lang.	Nonlang.	Total	Lang.	Nonlang.	Total
			1973-74						
KEEP Class I (1st)	93.29	96.78	95.65	93.29	98.91	96.87	-.10	2.13	1.22
Rural Sch 1st	97.07	113.46	107.76	94.36	104.54	100.90	-2.71	-8.92	-6.86
Urban Sch 1 1st	- - -	- - -	- - -	90.02	94.66	92.63	- - -	- - -	- - -
KEEP Class II (K)	- - -	- - -	- - -	95.34	99.84	99.76	- - -	- - -	- - -
Rural Sch K	86.75	95.50	90.50	89.16	103.33	98.16	2.41	7.83	7.66
Urban Sch K	- - -	- - -	- - -	93.57	96.33	95.66	- - -	- - -	- - -
			1974-75 [3]						
KEEP Class I* (2d)	- - -	- - -	- - -	93.67	102.00	97.50	.38	3.09	.63
Rural Sch 2d*	- - -	- - -	- - -	92.90	94.40	92.80	-1.46	-10.14	-8.10
Urban Sch 2 2d	81.88	88.80	85.48	88.67	101.54	94.00	6.79	12.74	8.52
Sub Sch 2d	- - -	- - -	- - -	103.35	111.43	107.90	- - -	- - -	- - -
KEEP Class II* (1st)	94.04	99.26	99.04	93.13	94.71	93.92	-.81	-4.55	-5.12
Rural Sch 1st*	- - -	- - -	- - -	83.93	98.07	90.05	-5.23	-5.26	-8.11
Urban Sch 2 1st	85.41	93.41	90.00	87.50	97.95	92.40	2.09	4.54	2.40
Sub Sch 1st*	- - -	- - -	- - -	113.63	114.89	116.89	- - -	- - -	- - -
KEEP Class III (K)	65.39	70.14	68.54	104.39	105.54	105.32	39.00	35.40	36.70
Rural Sch K	89.50	87.67	87.92	100.31	106.00	102.62	11.06	18.33	14.70
Urban Sch 2 K	62.71	67.48	65.10	92.50	112.05	101.35	29.79	44.57	36.25
Sub Sch K	- - -	- - -	- - -	123.00	122.54	124.88	- - -	- - -	- - -

*(May, 1974 was last administration)

3. The administration previous to May 75 was May 74. However, different figures for Class II appear for the following reason: at the beginning of their 1st grade year in September three children dropped out and four more were added. In determining the change scores for 1974-75, these seven students' scores were eliminated to make comparisons with equivalent groups.

in the spring of 1974. KEEP's Class I and II both scored higher on the average in all three CTMM IQs than the two tested groups from Urban School 1, although these differences are not significant.

The CTMM also was given to a Rural School, largely populated by part-Hawaiians, on a neighbor island. The kindergarten were administered Level O in December, 1973 and May, 1974; they received this same level as first graders in September, 1974 and May, 1975. The first grade received Level O in December, 1973, but were given Level 1 in May, 1974 and again in the September and May of their second grade year (1974-75). The kindergarteners entering the school in 1974 were administered Level O in September of that year and in May, 1975.

In 1973-74, the Rural School first grade tested higher than KEEP's Class I on the pretest, but, though still slightly higher on the posttest, they decreased in all three IQs. The kindergarten, on the other hand, were lower in Language and Total IQ than the KEEP kindergarten on the posttest, but higher in Nonlanguage IQ. Although there are differences, they are inconsistent and too slight to be of any significance.

In 1974-75, KEEP's Class I was higher on all three IQs than the Rural School second grade, and gained, although slightly, from the last administration while the Rural School second grade decreased quite a bit. KEEP's Class II was higher in Language and Total IQ compared to the Rural School's first grade, and lost less IQ points. KEEP's Class III was higher in Language and Total IQ than the Rural School's kindergarten; was only .46 points below them in Nonlanguage IQ; and increased almost twice as much from the fall administration.

Another school in the Kalihi area (Urban School 2), situated in a housing area from which many KEEP students come (although with a lower percentage of

students from lower-income families) acted as a comparison for KEEP in 1974-75. The second grade, first grade, and kindergarten of Urban School 2 received the appropriate levels of the CTMM in September, 1974 and May, 1975.

KEEP's Class I was higher, although not significantly so, on all three IQs; the Urban School second grade, possibly because of the lower pretest mean, did increase more from the fall administration. KEEP Class II was lower only in Nonlanguage IQ, and is slightly higher in the other two IQs, although the comparison first grade, again, gains more points. KEEP Class II was slightly higher in Total IQ. The change scores reflect these differences.

The CTMM was also given to a second, first, and kindergarten class of a school in a middle-class suburb of Honolulu. Not unexpectedly, all three classes did much better than KEEP, although one should note that KEEP's Class I and their second grade are both in the average range of IQ.[4]

The CTMM's various levels are standardized in such a manner that the mean score of a population at each age is 100. KEEP's Class I and II scored slightly below the mean at each spring administration; Class III scored more than slightly above it. The relatively comparable Kalihi schools were doing similarly. According to the national norm, on the first spring administration for each class, 38% of Class I, 52% of Class II, and 68% of Class III scored above the mean. These figures indicate that KEEP is improving over the years with its successive classes.

MRT

The Metropolitan Readiness Test (MRT) "is devised to measure the extent to which school beginners have developed the several skills and abilities that

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[4]The suburban school was expected to score much higher than KEEP on all tests. It was not chosen as a standard for absolute scores, but a comparison or measurement of progress made over the year.

contribute to readiness for first grade instruction."[5]

This test was given to each KEEP class at the beginning and end of their kindergarten year, 1972-73, 1973-74, and 1974-75 (see Table 4). Any examination of the test results should bear in mind that the MRT is usually given at the beginning of first grade. Like the CTMM, it is a group administration.

Table 4

Mean MRT Pre-, Posttest, and Change Percentiles, KEEP & Comparisons

Group	Pretest	Posttest	Change
KEEP Class I*	19.00	60.32	41.32
KEEP Class II**	12.52	50.84	38.52
Rural School K**	12.70	51.70	39.00
Urban 2 Ka**	10.50	40.28	29.78
Urban 2 Kb**	6.84	36.86	30.02
KEEP Class III***	7.93	48.68	40.75
Rural School K***	15.88	56.67	40.79
Urban 2 K***	6.48	53.47	46.99
Suburban K***	30.00	81.71	51.71

* 1972-73
** 1973-74
*** 1974-75

[5]Manual of directions. Metropolitan Readiness Test. Harcourt, Brace, & World, New York: 1969.

In 1973-74, the MRT was administered in the fall and spring to the kindergarten and first grade of the same Rural School at which the CTMM was given. The first grade data are omitted since all other data are based on kindergarten administrations. In 1974-75, the MRT was again administered to the Rural School kindergarten in fall and spring.

Urban School 2's two kindergarten classes (Ka and Kb) were administered the MRT in the fall of 1973 and the spring of 1974. The kindergarten which entered Urban School 2 in 1974 was administered the MRT in that fall and in spring of 1975.

In 1974-75, the MRT was given to the Suburban School kindergarten in fall and spring.

Class I had no comparison group when tested, but, in comparison to later administrations had the highest mean percentile on the posttest (with the exception of the Suburban School K) and one of the highest change scores. This class also replicated to some extent the dichotomy found in the WPPSI administration. Children who initially scored low on the MRT (scores 49 or below) changed 43.13 average points from a mean of 12.61 to a mean of 55.74 while children who scored 50 or higher in November changed only 22.34 (from 67.33 on the pretest) to 89.67 on the posttest. Both groups, however, changed considerably. This division was not replicated in the other two KEEP classes.

In 1973-74, 72% of Class II posttested at or above average compared to 56% for Urban School 2 Ka and 59% for Urban School Kb. The Rural School scored 73% at or above average. Forty percent of Class II were in the High Normal range compared to 8% for Urban School Ka, 14% for Urban School 2 Kb, and 27% for the Rural School. KEEP Class II and the Rural School K are in the average range while both Urban School 2's kindergarteners are Low Normal.

In 1974-75, 71% of Class III posttested at or above average compared to

78% at or above average for Urban School 2 K, 100% for Rural School K, and 100% for the Suburban School K. KEEP's Class III had the lowest percentage of students at or above average; however, on the pretest given this class, only one child out of 28 tested in the average range. Also, 39% of Class III were in the High Normal range compared to 26% for the Urban School K and 25% for the Rural School K. Not unexpectedly, 88% of the Suburban School post-tested in the High Normal range.

An examination of the results of these administrations shows all three KEEP classes to be doing well by the end of their kindergarten year both in terms of the standardized measures of the MRT and in terms of the comparison groups.

Gates

The Gates-MacGinitie Reading Test is designed to measure reading achievement at each grade level and is normally administered at the end of the school year. It is composed of two subtests, one for vocabulary and one for comprehension. The Gates is a standardized test with norms established (in 1965) at each age for the hand scored version used in the KEEP testing.

The Gates Primary A was given to Class I, and the first grade of Urban School 1, Rural School, and Suburban School in May, 1974. In May, 1975, the Gates Primary A was given to Class II and the first grade of Urban School 1, Urban School 2, Rural School, and the Suburban School while the Gates Primary B was given to Class I, and the second grade of Urban School 1 and 2, the Rural School, and the Suburban School. The results of these administrations are presented in Table 5.

In 1974, KEEP and Urban School 1 tested about the same, below grade level and below average. The Rural School did better than both, and the Suburban School, as expected, did much better than all other groups. The Suburban

Table 5

Gates Mean Standard Score, Percentile, & Grade Score: KEEP & Comparisons

Group	Vocabulary			Comprehension			Composite	
	S. S.	%	Grade Score	S. S.	%	Grade Score	S. S.	%
KEEP I*	34.50	6	1.3-1.4	37.2[illegible]	10	1.4	35.54	7-8
Rural *	40.08	16	1.4	40.50	16	1.5	40.29	16
Urban 1*	33.50	4.5	1.3	37.91	12	1.5	35.70	7-8
Suburban*	51.71	5[illegible]	2.3	50.60	53	2.0	51.14	54
KEEP I**	38.08	13	1.6	35.29	7.5	1.6	36.71	8-10
Rural 2d*	43.55	25.5	2.3-2.4	39.67	15	1.9-2.1	41.33	18-21
Urban 1 2d**	33.86	4.5	1.4	37.81	11	1.7	35.83	7-8
Urban 2 2d**	42.74	22.5	2.2	38.22	13	1.8	40.48	16-18
Suburban 2d**	53.82	62	3.5-3.6	51.18	54	3.1-3.4	52.5[illegible]	58-62
KEEP II**	41.71	19.5	1.6	37.82	11.5	1.4-1.5	39.61	14-16
Rural 1st**	40.53	17	1.5-1.6	33.67	4.5	1.3	35.77	10-12
Urban 2 1st**	39.38	15	1.5	35.94	7.5	1.4	37.97	10-12
Suburban 1st**	52.58	60	2.3-2.4	53.81	64	2.1-2.2	53.18	62-66

* 1973-74 administration (1st grade only)

** 1974-75 administration

School was at grade level in comprehension and a little above in vocabulary.

In 1975, Class I tested quite a bit below grade level. In comparison to the two Urban Schools, Class I did slightly better than School I and slightly worse than School 2. None of these differences are significant. As in 1974, the Rural School did better than all three and the Suburban School scored above grade level.

Class II, on the other hand, tested only slightly below grade level and did better, although not significantly, than both Urban School 2 and the Rural School. The Suburban School tested above grade level.

Discussion

In terms of reading skills, as measured by the Gates, KEEP's Class I and II are reading at or a little below the same level as they would in the schools they normally would have attended, although the reading performance of all schools tested is disappointing.

In terms of general intellectual ability and academic readiness, KEEP's educational responsibilities for its students are being met. On the basis of national norms, KEEP classes are in the average range of general intellectual skills, as measured by IQ, and doing as well or better in this area at KEEP as they would have in the schools they ordinarily would have attended. All three KEEP classes are well above average in the skills necessary for academic readiness, as measured by the Metropolitan, and doing as well or better than other classes with comparable populations.